Minnesota Galls.

A Thesis.

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by

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Preface

In this work the object was to make the classifying of insect galls possible for a person without extensive botanical knowledge.

With this in view, a key has been made, referring to descriptions and illustrations. The key is based on obvious characters and the descriptions made from direct study of specimens, except where a reference is cited. The illustrations give, in each case, a type view and a longisection.

Only a small proportion of the galls included in the key are described and illustrated here, but the arrangement of the completed work is indicated in the plant list. This is an alphabetical tabulation of host plants, with the galls occurring upon them. The galls one each plant are grouped according to the part affected, and those one each organ according to the taxonomic position of the gall-maker.

The bibliography includes references to only articles or books giving descriptions of Minnesota galls, or papers of general interest.

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Plant list.

Antennaria.

Bud. 1. Asynapta antennariae.

Arrow-Wood. (Viburnum)

Leaf. 2. Eriophyes sp.

Ash. (Fraxinus)

Bud. 3. Eriophyes sp.

Leaf. 4. Cecidomyia pellex.

5. Cecidomyia? sp.

6. Cecidomyia? sp.

7. Eriophyes sp.

Aspen. (Populus)

Stem. 8. Agromyza schinerae.

Leaf. 9.

10. Cecidomyia? sp.

11. Cecidomyia sp.

12. Eriophyes sp.

13. Ectoedemia populella.

Aster. (Aster)

Stem. 14. Rhopalomyia hirtipes.

15. Gnorimoschema sp.

Flower. 16. Rhopalomyia lateriflorae.

Basswood. (Tilia).

Leaf. 17. Cecidomyia verrucicola.

18. Eriophyes abnormis.

Bergamot, Wild. (Monarda).

Stem. 19. Cecidomyia monardi.

Birch. (Betula).

Bud. 20. Eriophyes betulae.

Blueberry. (Vaccinium).

Stem. 21. Solenozopheria vaccinii.

Boxelder. (Acer).

Leaf. 22. Contarinia negundifoliae.

23. Cecidomyia? sp.

24. Eriophyes sp.

Button bush. (Cephalanthus).

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Fruit. 26. Contarinia virginianae.

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Leaf. 28. Eriophyes pruni-crumena.

29. Eriophyes sp.

30. Eriophyes sp.

Cottonwood. (Populus).

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32. Pemphigus transversus.

33. Pemphigus vagabundus.

Currant. (Ribes).

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Dandelion. (Taraxacum.)

Leaf. 35. Aylax taraxaci.

Dogwood. (Cornus).

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Leaf. 38. Cecidomyia sp.

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Bud. 39. Eriophyes sp.

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42. Schizoneura americana.

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46. Gnorimoschema gallaesolidaginis.

Leaf. 47. Rhopalomyia solidaginis.

48. Rhopalomyia anthophila.

49. Asteromyia rubra.

Grape. (Vitis).

Stem. 50. Cecidomyia coryloides.

51. Cecidomyia? sp.

Leaf. 52. Schizomyia petiolicola.

53. Cecidomyia? sp.

54. Phylloxera vastatrix.

55.

Ground Ivy. (Glechoma).

Leaf. 56. Aylax glechomae.

Hackberry. (Celtis).

Leaf. 57. Cecidomyia unguicola.

58. Cecidomyia? sp.

59. Pachypsylla celtidis-mamma.

Leaf. 60. Pachypsylla celtidis-mamma.

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Catkin. 61. Cecidomyia squamulicola.

Leaf. 62. Lasiopteryx coryli.

Horse-weed. (Erigeron).

Stem. 63. Neolasioptera erigerontis.

June-berry. (Amelanchier).

Leaf. 64. Hormomyia canadensis.

65. Eriophyes amelanchieri.

Lettuce. (Lactuca).

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Leaf. 67. Dasyneura communis.

68. Eriophyes aceris-crumena.

69. Eriophyes quadripes.

70. Eriophyes sp.

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Stem. 71. Lasioptera convolvuli.

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Black oak group.

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	76. Holcaspis ventricosus.
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	78. Amphibolips tinctoriae.
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Ament.	80.
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	84. Amphibolips confluentis.
	85. Amphibolips nubilipennis.
	86. Andricus rileyi.
	87. Andricus singularis.
	88. Callirhytis pustulatoides.
	89. Cynips cristata.
	90. Cynips decidua.
	91. Cynips? sp.
	92. Cynips? sp.

Leaf. 93. Cynips? sp.

94. Cynips? sp.

95. Philonix compressa.

96. Dryophanta lanata.

97. Dryophanta palustris.

98. Neuroterus favosus.

99. Itonida foliora.

100. Cecidomyia niveipila.

101. Cecidomyia pustuloides.

102. Cecidomyia? sp.

103. Cecidomyia? sp.

104. Cincticornia globosa.

105. Cincticornia pilulae.

106. Cincticornia podagrae.

107. Eriophyes sp.

Bur Oak. (Quercus macrocarpa).

108. Holcaspis mamma.

109. Cynips frondosa.

110. Neuroterus vesiculus.

Leaf. 111. Andricus dimorphus.

112. Neuroterus flawipes.

113. Andricus pattoni.

114. Andricus petiolicola.

115. Cynips? sp.

116. Cynips? sp.

117. Cynips? sp.

118. Philonix erinacei.

119. Philonix macrocarpae.

120. Neuroterus floccosus.

121. Neuroterus nigrum.

122. Neuroterus saltatorius.

White Oak. (Quercus alba).

Stem. 123. Callirhytis clavula.

124. Biorhiza forticornis.

125. Callirhytis seminator.

126. Holcaspis globulus.

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128. Andricus utricula.

129. Andricus sp.

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Leaf. 131. Cynips? sp.

132. Cynips? sp.

133. Cynips? sp.

134. Cynips?sp.

135. Philonix villosa.

118. Philonix erinacei.

136. Biorhiza mellea.

137. Dryophanta carolina.

110. Neuroterus vesiculus.

138. Cecidomyia poculum.

139. Cecidomyia sp.

140. Cecidomyia? sp.

141. Cincticornia serrata.

Poison Ivy. (Rhus).

Leaf. 142. Eriophyes rhoi.

Ragweed. (Artemisia).

Bud. 143. Cecidomyia? sp.

144. Cecidomyia? sp.

Flower. 145. Eriophyes sp.

146. Rhabdophaga? sp.

Leaf. 147. Rhopalomyia gnaphalodis.

Rose. (Rosa).

Stem. 148. Rhodites multispinosus.

149. Rhodites radicum.

150. Rhodites sp.

Bud. 151. Rhabdophaga rosacea.

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153. Rhodites gracilis.

154. Rhodites lenticularis.

155. Rhodites nebulosus.

156. Dasyneura rosarum.

Sumac. (Rhus).

Leaf. 157. Pemphigus rhois.

158. Eriophyes sp.

Sunflower. (Helianthus).

Stem. 159. Cecidomyia sp.

Bud. 160. Cecidomyia? sp.

Leaf. 161. Lasioptera bulla.

Tick-trefoil. (Meibomia).

Leaf. 162. Cecidomyia? sp.

Touch-me-not.(Impatiens).

Leaf. 16 3.Lasioptera impatientifolia.

Virginia Creeper. (Parthenocissus).

Leaf. 164. Dasyneura parthenocissi.

Willow. (Salix).

Stem. 165. Euura nodus.

166. Euura ovum.

167. Phytophaga rigidae.

168. Rhabdophaga batatas.

169. Rhabdophaga triticoides.

170. Cecidomyia sp.

171. Cecidomyia sp.

Bud. 172. Rhabdophaga brassicoides.

173. Rhabdophaga gnaphaloides.

174. Rhabdophaga strobiloides.

175. Eriophyes aenigma.

Leaf. 176. Pontania hyalina.

177. Pontania pomum.

178. Pontania sp.

179. Hormomyia verruca.

180. Cecidomyia? sp.

181. Eriophyes semen.

Witch Hazel. (Hamamelis).

Leaf. 182. Hormaphis hamamelidis.

Wolfberry. (Symphoricarpus).

Leaf. 183. Pontania?sp.

184. Cecidomyia? sp.

185. Cecidomyia? sp.

Wood Nettle. (Laportea).

Leaf? 186. Cecidomyia urnicola.

Key to Species of Galls.

I.Gall on leaf.		
1.Gall confined to petiole or petiole and midrib.		
a.Gall open.		
(1).Opening a transverse slit.	Pemphigus transversus	32.
(2).Opening oblique.	Pemphigus populicaulis	31.
b.Gall closed.		
(1).Galls separable from petiole.	Andricus sp.	129.
(2).Galls swellings of petiole or midrib.		
(a).Confined to base of petiole.	Cynips sp.	92.
(b).Confined to point of union of petiole and blade.	Ectoedemia populella.	13.
(c).Not confined to base or tip of petiole.		
x.One-chambered.	Schizomyia petiolicola.	52.
y.Several-chambered.		
(x).On oak.	Andricus petiolicola.	114.
(y).On dandelion.	Aylax taraxaci.	35.
2.Gall not confined to petiole.		
a.Gall a curl or fold of leaf.(not including depressions of blade).		
(1).Whole leaf irregularly deformed.		
(a).Gall lobed, on Cottonwood.	Pemphigus vagabundus.	33.
(b).Gall not lobed, on Wolfberry.	Cecidomyia? sp.	184.
(2).Leaf margin folded over or rolled.		
(a).Margin folded over but not rolled.		
x.Fold complex, with inner chamber.	Cecidomyia? sp.	10.

y.A deep depression, depth equal to or greater than diam.

(x).Gall a capsule, projecting above and below, opening small.

m.On maple.	Eriophyes sp.	70.
n.On willow.	Eriophyes semen.	181.

(y).Gall a pouch. projecting on one side, opening fairly large.

m.Apex lobed and irregular.

(m).Galls flattened laterally.	Eriophyes sp.	29.

(n). Galls not flattened .

r.On basswood	Eriophyes abnormis.	18.
s.On maple.	Eriophyes quadripes.	69.
t.On arrow-wood.(Viburnum).	Eriophyes sp.	2.

n.Apex not lobed.

(m).Apex coiled.	Eriophyes amelanchieri.	65.

(n).Apex not coiled.

r.Apex long-pointed,acuminate.	Eriophyes aceris-crumena.	68.

s.Apex merely acute.

(r).On elm.	Eriophyes ulmi.	43.
(s).On cherry.	Eriophyes pruni-crumena.	28.
t.Apex rounded,wider than base.	Eriophyes sp.	30.

((B).With interior as smooth as leaf surface.

x.Gall a pouch-like swelling, longer than wide.Opening slit-like.

(x).Gall covered with more hairs than leaf surface.

y.Fold simple.		
(x). On white oak.	Cecidomyia? sp.	139.
(y). On scarlet or red oak.	Cecidomyia foliora.	99.
(z). On elm.	Schizoneura americana.	42.
(a).Margin rolled.		
x. Whole leaf rolled.	Eriophyes sp.	158.
y. Only outer margin rolled.	Cecidomyia? sp.	38.
(3).Edges of leaf folded together.		
(a).On cherry.	Microdiplosis cerasifoliae.	27.
(b). On rose.	Dasyneura rosarum.	156.
(c).On tick-trefoil.	Cecidomyia? sp.	162.
bb.Gall a definite structure.		
1. (a).Gall open.		
(a). With interior lined with an abnormal growth of hairs.		
xx. A shallow depression, depth not more than diam., opening large.		
(x).Gall lined with white hairs.		
m.On ash.	Eriophyes sp.	7.
On buttonbush.	Eriophyes cephalanthae.	25.
On oak.	Eriophyes sp.	107.
On poison ivy.	Eriophyes rhoi.	142.
(y).Gall lined with reddish hairs.		
m.Gall circular, on aspen.	Eriophyes sp.	12.
n.Gall irregular, on boxelder.	Eriophyes sp.	24.

m.On hazel	Lasiopteryx coryli.	62.
n.On oak.	Cecidomyia niveipila.	100.
(y).Gall not more hairy than leaf surface.		
m.Opening on same side of leaf as gall.	Cecidomyia? sp.	103.
n.Opening on opposite side.		
(m).Gall either a swelling of a vein or parallel to it.		
r.On ash.	Cecidomyia? sp.	15.
s.On elm.	Colopha ulmicola.	40.
t.On box-elder.	Cecidomyia? sp.	23.
u.On maple.	Dasyneura communis.	67.
v.On oak.		
(r).Diam. about 5 mm.	Cecidomyia? sp.	102.
(s).Diam. about 10 mm.	Cecidomyia? sp.	140.
(n).Gall not along veins.	Cecidomyia? sp.	185.
y.Gall pouch-like,opening not slit-like.		
(x).Gall projecting on both surfaces.		
m.Diam. 7-10 mm.,on wild sunflower.	Lasioptera bulla.	161.
n.Diam. 2-5 mm.,on aspen.	Cecidomyia? sp.	11.
(y).Gall projecting on one side only.		
m.Gall a very shallow depression.	Myzus ribis.	34.
n.Gall a definite pouch.		
(M).Pouch lobed or serrate at apex.	Phylloxera vastatrix.	54.
(n).Pouch not lobed or serrate.		
r.Gall elongated,pointed.		
(r).On witch-hazel.	Hormaphis hamamelidis.	182.
(s).On elm.	Pemphigus fusus.	41.

s.Gall rounded, wider than high.

(r).On boxelder.	Contarinia negundifolia.	22.
(s).On sumac.	Pemphigus rhois.	157.

(2).Gall closed.

(a).Gall projecting on both sides of leaf.

x.With one or more separate larval chambers contained in outer shell.

(x).Inner chamber upheld by fibers, radiating from it.

m.With one inner chamber.

(m).Chamber central.	Andricus singularis.	87.
(n).Chamber basal.	Biorhiza forticornis.	124.

n.With several chambers. Andricus futilis. 127.

(y).Inner chamber unattached.

m.Gall spherical, diam.5-10mm.	Dryophanta palustris.	97.
n.Gall oval, diam.3 by 6 mm.	Callirhytis pustulatoides.	88.

y.With a single wall and one or more cavities within.

(x).Gall a flat blister of blade, with only slightly thickened walls.

mm.Gall circular, diam.about 1.7--10mm.

(m).With a minute elevation in center of lower side.

r.Gall4-6 mm.wide,on oak.	Cecidomyia pustuloides.	101.

s.Gall about 2-3 mm. wide.

(r).On ash.	Cecidomyia? sp.	6.
(s).On Grape.	Cecidomyia? sp.	53.

(t).On hackberry. Pachypsylla c-vesiculum. 60.

(u).On rose. Rhodites lenticularis. 154.

(n).Gall without an elevation.

r.Gall projecting almost entirely on upper side.

(r).ON dogwood,diam. 6 mm. Lasioptera corni. 37.

(s).On oak. Cincticornia serrata. 141.

s.Gall projecting equally from both sides. Asteromyia rubra. 49.

n.Gall oval,width about 1-2.5mm.

(m).Gall chiefly along larger veins.Neuroterus nigrum. 121.

(n).Gall not along veins.

r.Gall a swelling of leaf base.Cecidomyia balsamicola. 44.

s.Gall on any part of leaf.

(h).Developing in early spring, Insects emerging from upper side. Cynips? sp. 115.

(i).Developing in autumn, insects emerging from lower side. Cynips? sp. 131.

(y).Gall a definitely thickened structure.

m.Gall one-chambered.

(m).Projecting equally, or almost so, from both surfaces.

r.Gall circular in outline.

(r).Almost spherical,on oak. Andricus utricula. 127.

(s).A flattened disc, on linden.Cecidomyia verruciocla. 17.

s.Gall elongated or oval in outline.

(r).Gall confined to midrib.

h.Gall woody, on willow.	Cecidomyia? sp.	180.
i.Gall succulent, on Touch-me-not.	Lasioptera impatientifolia	163.

(s).Gall not confined to midrib.

h.Gall dark reddish, on willow.	Pontania hyalina.	176.
i.Gall green, on wolfberry.	Pontania? sp.	183.

(n).Gall projecting unequally.

r.Gall projecting more on lower side.

(r)Gall fuzzy above.	Hormomyia canadensis.	64.

(s)Gall smooth above.

h.Gall pointed below.	Hormomyia verruca.	179.
i.Gall rounded below.	Pontania pomum.	177.

s.Gall projecting more on upper side, covered with leaf-like structures. Cynips? sp. 116.

n. Gall several chambered.

(m).Gall very succulent when fresh.

r.Gall smooth, on oak.	Cynips majalis.	130.
s.Gall with scattered hairs.	Aylax glechomae.	56.

(n).Gall firm-fleshy to woody.

r.Gall in blade near petiole.		9.
s.Gall on midrib or its branches.	Andricus flavipes.	111.

t.Gall scattered on blade.

(r).Gall with long-pointed projections below. Hormomyia verruca. 179.

(s).Gall smooth below. Neuroterus favosus. 98.

(b).Gall attached to one side of leaf.

x.Gall covered with hairs,spines,or regular projections of some sort.

(x).Gall covered with spines or pointed elevations.

m.Surface smooth,bearing long spines Rhodites bicolor. 152.

n.Surface covered with convex,polygonal areas.

(m).Convexities bearing spines. Philonix erinacei. 118.
Philonix villosa. 135.

(n).Convexities merely pointed. Philonix macrocarpae. 119.

(y).Galls covered with hairs.

m.Galls covered with dense wooly coating, obscuring outline.

(m).Galls sunken in depression. Neuroterus floccosus. 120.

(n).Galls not sunken on depression.

r.In groups along veins,losing individuality in mass.

(r).Gall, with hairs removed long oval. Andricus pattoni. 113.

(s).Gall, pyramidal. Dryophanta lanata. 96.

s.Not confined to veins,not losing individuality in mass.

(r).Hairs white. Rhopalomyia gnaphalodis. 147.

(s).Hairs brown. Cynips cristata. 89.

n.Galls covered with short hairs, not completely obscuring outline.

(m).Galls in groups along veins.

r.Galls spherical,on upper surface.

(r).With a depression in apex. Cynips? sp. 91.

(s).Without a depression in apex. Biorhiza mellea. 136.

s. Galls triangular in outline, on lower surface. Cynips? sp. 93.

(n).Galls scattered singly.

r.Galls spherical or flattened.

(r).Gall one-chambered. Cynips? sp. 133.

(s).Gall several chambered. Cynips? sp. 137.

s.Galls blunt-conic with a wide base.

(r).Gall about 4 mm. high. Cecidomyia? sp. 58.

(s).Gall about 6-7mm.high. Pachypsylla c-mamma. 59.

(y).Galls smooth.

m.Gall attached by area more than 1/2 diam. of gall wide.

(m).Gall a swelling of midrib. Cincticornia podagrae. 106.

(n).Gall not confined to midrib.

r.Gall with an apical, thickened disc.

(r).Galls dark purple.	Cincticornia globosa.	104.
(s).Galls light brown.	Cynips? sp.	94.
(r).Galls without apical disc.		
h.Galls on ash.	Cecidomyia pellex.	4.
i.Galls on hackberry.	Pachypsylla c-mamma.	59.
j.Galls on oak.	Cincticornia pilulae.	105.
n.Galls attached by area less than 1/2 diam. of gall.		
(m).Galls with outer shell and inner larval chamber.(separate)		
r.Inner chamber upheld by radiating fibers.	Amphibolips inanis.	83.
s.Inner chamber upheld by spongy mass.	Amphibolips confluentis.	84.
(n).Galls with single wall and one or more cavities within.		
r.Galls in compact masses along midrib.		
(r).Light greenish.	Cynips decidua.	90.
(s).Dark purplish brown.	Andricus dimorphus.	111.
s.Galls scattered over leaf.		
(r).Sunken in depression.	Neuroterus saltatorius.	122.
(s).Galls not sunken.		
h.Galls flattened discs.	Cecidomyia poculum.	138.
i.Galls spherical, with no projections.		
(h)Diam.about 1 cm.	Amphibolips nubilipennis.	85.

(i).Diam.About 1-5mm.

e.On oak.

(e).Diam. more than 1 mm. Philonix compressa. 95.

(f).Diam. less than 1 mm.

*On white oak.

+ Galls pink. Cynips sp. 134.

++ Galls brownish. Cynips sp. 132.

**On bur oak. Cynips sp. 117.

f.On rose.

g.On willow. Pontania sp. 177.

j.Galls neither spherical nor disc-like.

(h).Bearing a number of blunt projections. Rhodites gracile. 153.

(i).Without projections.

e.On hackberry. Cecidomyia unguicola. 57.

f.On oak. Andricus rileyi. 86.

g.On wood-nettle. Cecidomyia urnicola. 184.

(3).Swelling not confined to base of apex.

(a).Gall a gradual enlargement of stem, longer than wide.

x.Larvae in transformed buds,within bud-scale, gall white-hairy. Rhabdophaga triticoides. 169.

y.Larvae in pith in center of stem, or stem hollow.

(x).Gall with one cavity.

m.On goldenrod,1 - 1.5 cm. wide. Gnorimoschema gallaesolidaginis. 46.

n.On wild bergamot,abput 2mm.wide. Cecidomyia monardi. 19.

(y).Gall with two cavities,on willow. Euura nodus. 165.

(z).Gall with many cavities.

m.On grape. Cecidomyia? sp. 51.

n.On horse-weed. Neolasioptera erigerontis. 63.

o.On wild lettuce. Aylax tumidus. 66.

p.On willow. Cecidomyia? sp. 170.

(b).Gall an abrupt enlargement of stem, as wide or wider than long.

x.Gall one-chambered.

(x).On goldenrod. Trypeta solidaginis. 45.

(y).On wild morning-glory. Lasioptera convolvuli. 71.

y.Gall many-chambered.

(x).Gall at base of lateral branch.

m.With branched,moss-like spines. Rhodites sp. 150

n.With unbranched spines. Rhodites multispinosus. 148.

II. Galls on Stem.

1.Gall an enlargement of stem, not separable from it.

a.Swelling on one side of stem only.

(1).Gall open	Lasioptera bulla.	161.
(2).Gall closed.		
(a).Gall spherical, in whorls.	Andricus davisi.	72.
(b).Gall oval,occurring singly or in groups scattered along stem.		
x.On willow.	Euura ovum.	166.
y.On aspen.	Agromyza schinerae.	8.
z.On blueberry.	Solenozopheria vaccinii.	21.

b.Swelling extending around stem.

(1).Swelling confined to basal part of stem, or to root-stock.		
(a).Gall underground,near surface.		
x.On aster, on rootstock.	Rhopalomyia hirtipes.	14.
y.On rose.	Rhodites radicum.	149.
(b).Gall above ground.	Gnorimoschema sp.	15.
(2).Swelling confined to tip of stem, sometimes bearing branches extending beyond apex.		
(a).Cavity one.		
x.On dogwood.	Dasyneura sp.	36.
y.On willow.	Phytophaga rigidae.	167.
(b).Cavities numerous.		
x.On scarlet oak.	Callirhytis scitula.	73.
y.On white oak.	Callirhytis clavula.	123.
z.On willow.	Cecidomyia? sp.	171.

(y).Gall not confined to base of lateral branch.

m.On oak.	Callirhytis punctata.	74.
n.On willow.	Rhabdophaga batatas.	168.
o.On wild sunflower.	Cecidomyia? sp.	159.

2.Galls separable structure.

a.Galls in large masses, attached to a central point.

(1).Galls deeply wooly.	Callirhytis seminator.	125.
(2).Galls merely pubescent.	Cecidomyia coryloides.	50.

b.Galls not attached to a central point, though sometimes close together.

(1).Galls with outer shell and inner, separate larval chamber.		
(a).Chamber connected with outer shell by fibers, outer wall thin.	Biorhiza forticornis.	124.
(b).Chamber lying free within outer wall, wall thin.		
x.Galls with pointed apex.	Holcaspis mamma.	108.
y.Galls spherical.	Holcaspis globulus.	126.
(2).Galls with a single wall.		
(a).Galls with long-pointed apex.	Andricus ventricosus.	76.
(b).Galls spherical.	Holcaspis fasciata.	

III. Bud Galls.

1.Gall a leafy mass.

a.Gall resembling a pine-cone, with rather definitely arranged scales.

(1).Gall densely wooly, on Antennaria.	Asynapta antennariae?	1.
(2).Gall smooth or merely pubescent.		
(a).Gall with closely appressed scales.	Rhabdophaga strobiloides.	174.
(b).Gall with loosely arranged scales.		
x.On ragweed.(Artemisia).	Cecidomyia? sp.	144.
y.On rose.	Rhabdophaga rosacea.	151.
z.On wild sunflower.	Cecidomyia? sp.	160.

b.Gall a loose, leafy mass, not cone-shaped.

(1).Leaves surrounding a single, hard-walled gall in center.	Cynips fromdosa.	109.
(2).No definite, hard-walled gall present.		
(a).Leaves readily recognisable,some with broad blades.		
x.On elm.	Eriophyes sp.	38.
y.On goldenrod.	Rhopalomyia solidaginis.	47.
z.On willow.		
(x).Leaves white pubescent.	Rhabdophaga gnaphaloides.	173.
(y).Leaves smooth.	Rhabdophaga brassicoides.	172.
(b).Leaves much deformed and reduced.		
x.Gall densely white hairy.	Cecidomyia? sp.	143.
y.Gall smooth or merely pubescent.		
(x).On ash.	Eriophyes sp.	3.
(y).On willow.	Eriiphyes aenigma.	175.

2.Gall a single structure.

a.Gall projecting far from bud-scales.

(1).Gall with outer wall and inner,separate, larval chamber, upheld by fibers.

(a).Gall pointed, keeled.	Amphibolips tinctoriae.	78.
(b).Gall spherical.	Amphibolips cooki.	79.
(2).Gall with single wall.	Andricus gallaestriatae.	77.
b.Gall surrounded by scales.	Neuroterus vesiculus.	110.
3. Gall consisting of an excessive production of buds.	Eriophyes betulae.	20

IV. Flower and fruit galls.

1.Galls <u>borne on</u> flower or fruit.

a.Galls readily separable structure.

(1).Galls affecting acorns of oak.

(a).Gall a sphere on side of cup.	Amphibolips prunus.	81.

(2).Galls affecting aments of oak.

(a).Gall one-chambered.	Dryophanta palustris.	97.
(b).Gall several-chambered.	Cynips? sp.	80.

b.Galls not readily separated from part affected.

(1).Gall an enlargement of catkin of hazel.	Cecidomyia squamicola.	61.
(2).Gall an enlargement of fruit of plum.	Contarinia virginianae.	26.
(3).Gall formed inside shell of acorn.	Callirhytis fruticola.	82.

2.Galls <u>formed from</u> bud of flower, entirely preventing its development.

a.Gall a single structure.

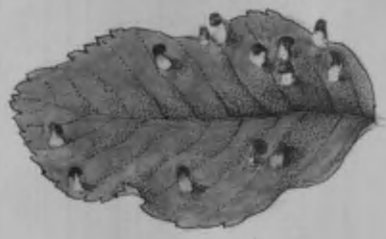
(1).Gall elongated cylindrical.	Rhopalomyia anthophila.	48.
(2).Gall pointed oval.	Rhopalomyia lateriflorae.	16.

b.Gall a mass of leafy structures.

(1).Gall somewhat cone-like,bracts lanceolate.Rhabdophaga sp. 146.

(2).Gall a confused mass, bracts irregular. Eriophyes sp. 145.

Acarina.



Eriophyes amelanchieri. Stebbins.

Galls on upper surface of leaf, elongated pouch shaped, flattened, apex coiled, base slightly wider, smooth, shining, upper half deep purplish red, basal part light yellow, height 2.5 - 3 mm., width at base 2 - 2.5 mm., at apex 1 - 1.5 mm., opening on lower side of leaf, narrow, slit-like, with a thickened rim; Cavity lined with transparent, spherical granules; on June-berry (Amelanchier), occurring in numbers on leaf, collected in June.

Diptera.

Cecidomyiidae.

Cecidomyia verrucicola Osten Sacken.

Galls thickened discs in blade of leaf, projecting more below than above, with a small elevation in center of upper side and a corresponding minute depression or "dimple" below, smooth, pinkish brown, turning dark brown when old, diam. 2.5 - 5 mm., thickness 1 - 3 mm.; cavity single, much flattened, wall 1 - 1.5 mm. thick, woody around cavity, softer outside; very common on linden, (Tilia americana), occurring in large numbers on leaf, developing in June and remaining upon leaves through summer, after insects emerge becoming woody and cracked, the lower portion becoming detached, like a lid, and either remaining attached to upper part at one point or falling off.

Contarinia negundifolia Felt.

Gall irregularly hemispherical, on upper side of leaf, attached to leaf by an area equal to diam. of gall, with a small, irregular opening below, which is lined with soft white hairs, surface smooth or slightly uneven, green, often with a purplish tinge, diam. 2 - 2.5 mm., height 2 - 5 mm.; cavity single, or two, by coalescence of two galls, often irregular, lined especially near opening with a few scattered hairs, wall soft, succulent,.5 - 1 mm., thick; common on box-elder (Acer negundo), growing in the axil of a branch of the midrib or of one of the principal veins, appearing on lower surface as a swelling of both of veins affected, with opening in axil, one to six or more occurring on leaf, collected in June.

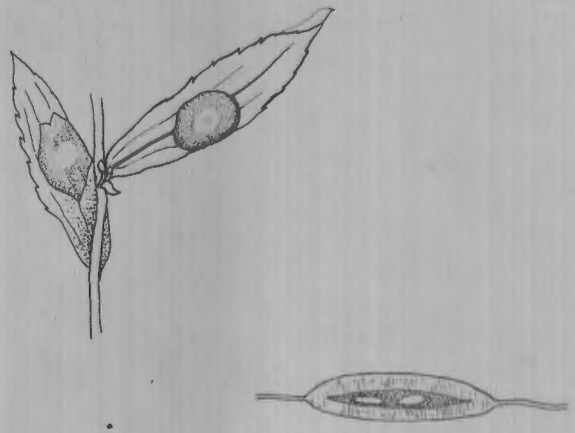
Rhopalomyia solidaginis Loew.

Gall terminal on stem, forming a large, compact rosette of stunted leaves, diam. 2 - 5 cm., height 2 - 3.5 cm., a few outer leaves of normal size, inner mass of several hundred leaves linear; larval chambers numerous, scattered between bases of leaves, diam. 1 - 1.2 mm., height 5 mm., cone-shaped, apparently representing modified leaves, stem bearing leaves developing little, forming a flattened receptacle; common on goldenrod (Solidago canadensis), collected in September and October.

Rhopalomyia anthophila Osten Sacken.

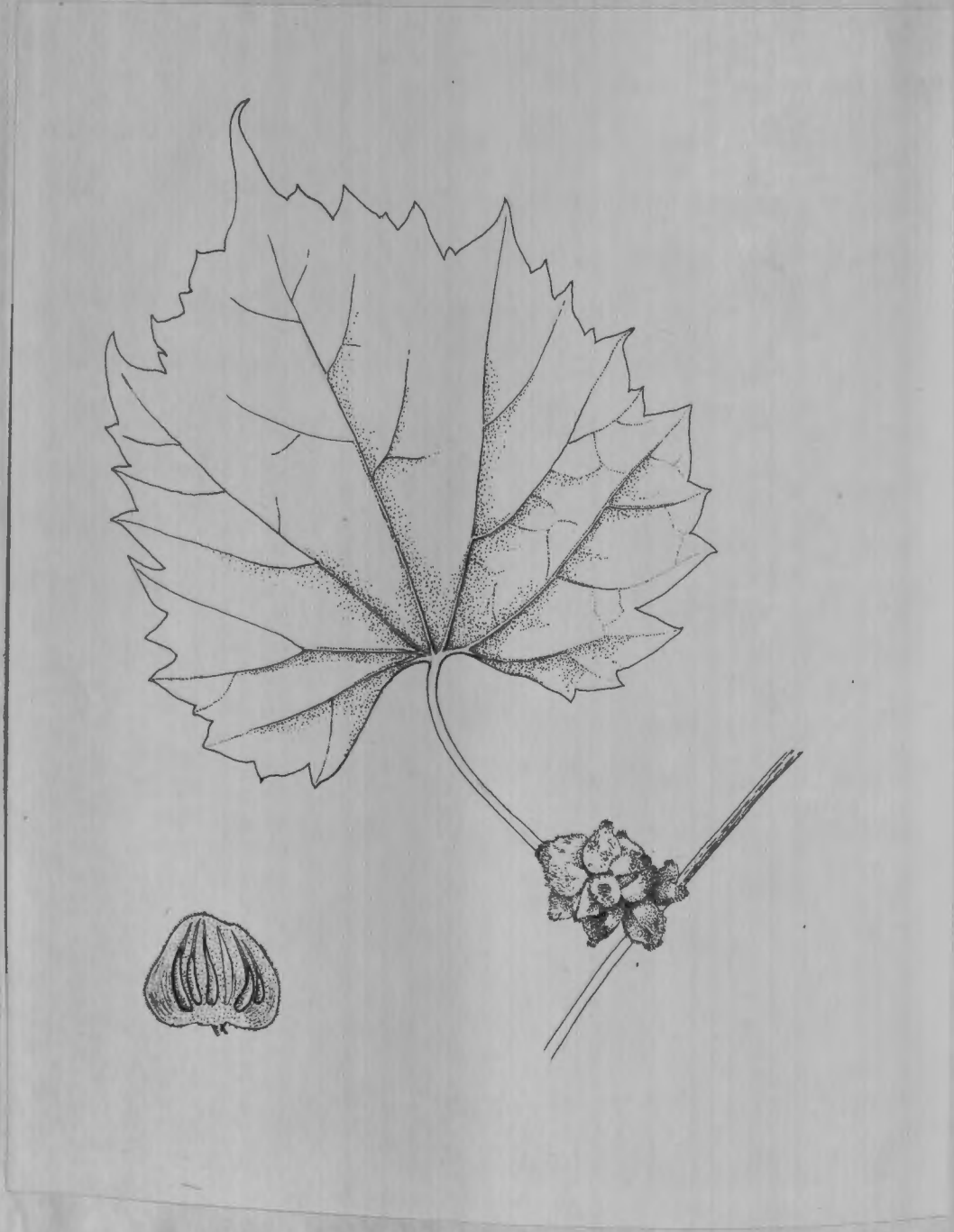
Galls developed from flowers, surrounded at base by bracts of involucre and undeformed flowers of head, elongated-cylindrical, base slightly wider, apex truncated, light green, covered with fine white pubescence, diam. at base 2 - 3 mm., at apex 1 - 2 mm., height .5 - 10 mm.; cavity single but divided at about half way from base to apex by a delicate, somewhat dome-shaped membrane, larva one, in lower chambwr, wall thin; common on goldenrod (Solidago canadensis), developing in large numbers on inflorescence , collected in late August and September.

Apparently, before the adult emerges the pupa makes its way up to the apex of the gall, breaking the membrane, for when the fly leaves the gall, the pupa case is left projecting from the opening made in the top of the gall. Adult insects in September.



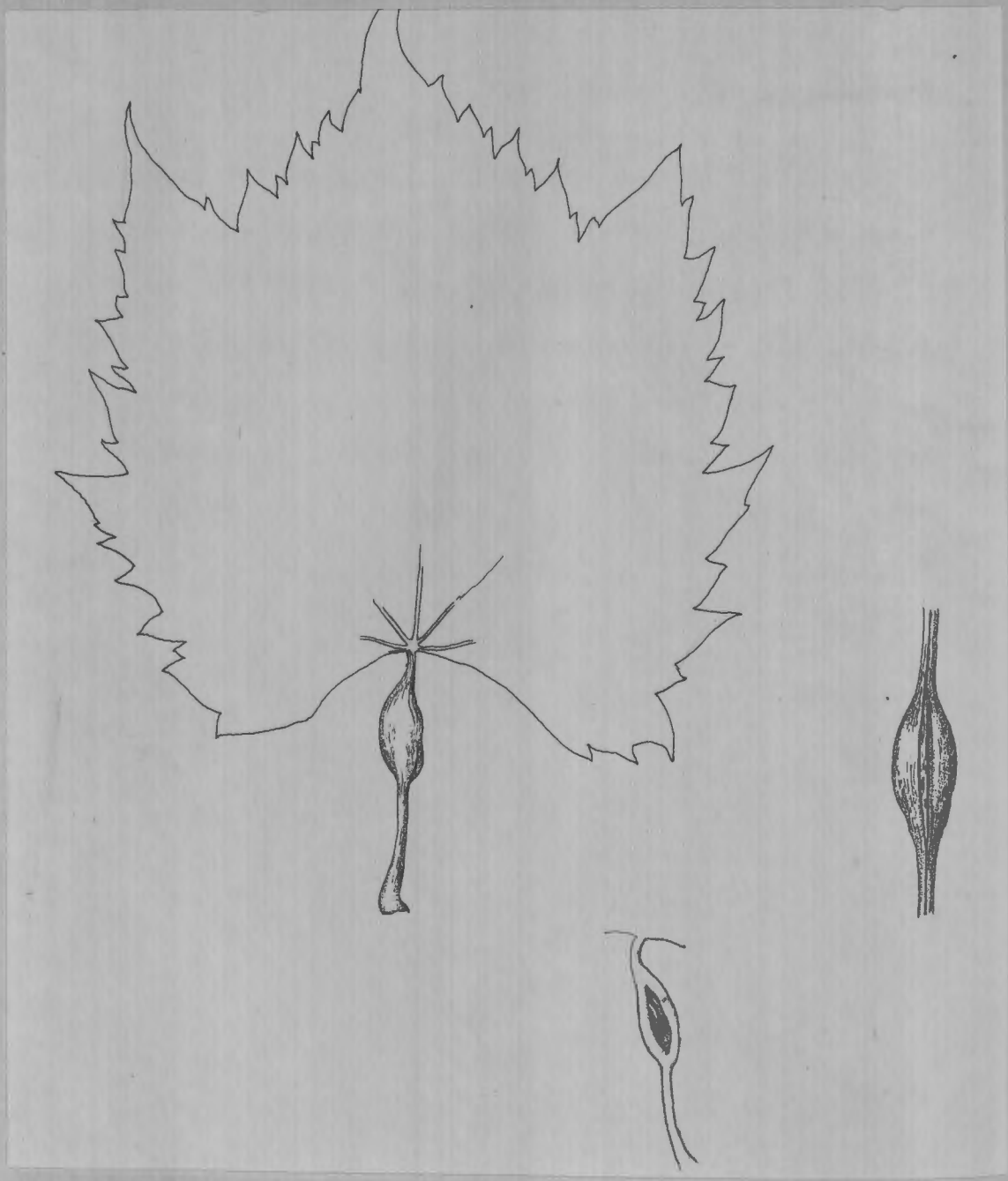
Asteromyia rubra Felt.

Gall a slightly thickened disc in blade of leaf, surface smooth and usually shining, center yellowish, surrounded by reddish purple, diam. about 4 - 7 mm. wide, 7 - 10 mm. long, thickness .75 - 2 mm.; cavities several, oval, containing much flattened larvae, occupying central layer of gall, which is composed of a black, carbon-like substance, outer layer, inside epidermis, composed of white cellular substance; on goldenrod, (Solidago canadensis), collected in September and October, adults the following spring.



Schizomyia coryloides Walsh and Riley.

Galls on stem, in masses of about 12 - 40, broadly spindle-shaped, somewhat resembling a filbert, but more pointed, apex sometimes turned sidewise, grooved lengthwise, covered with soft hairs, similar to those on young leaves, green or brown, size variable because of crowding of galls in cluster, width in well developed specimens about 2 cm., length 2 cm.; cavities 1 - 7, narrow, width about 1 mm., length 7 - 8 mm., surrounded by a thin woody wall, an extension of which runs up to apex of gall, outer part of wall thick, spongy, succulent; on wild grape (Vitis vulpina), growing from tip of stem in axil of leaf, representing transformed buds, a short piece of stem remaining and serving as a stalk for galls, collected in July and August.



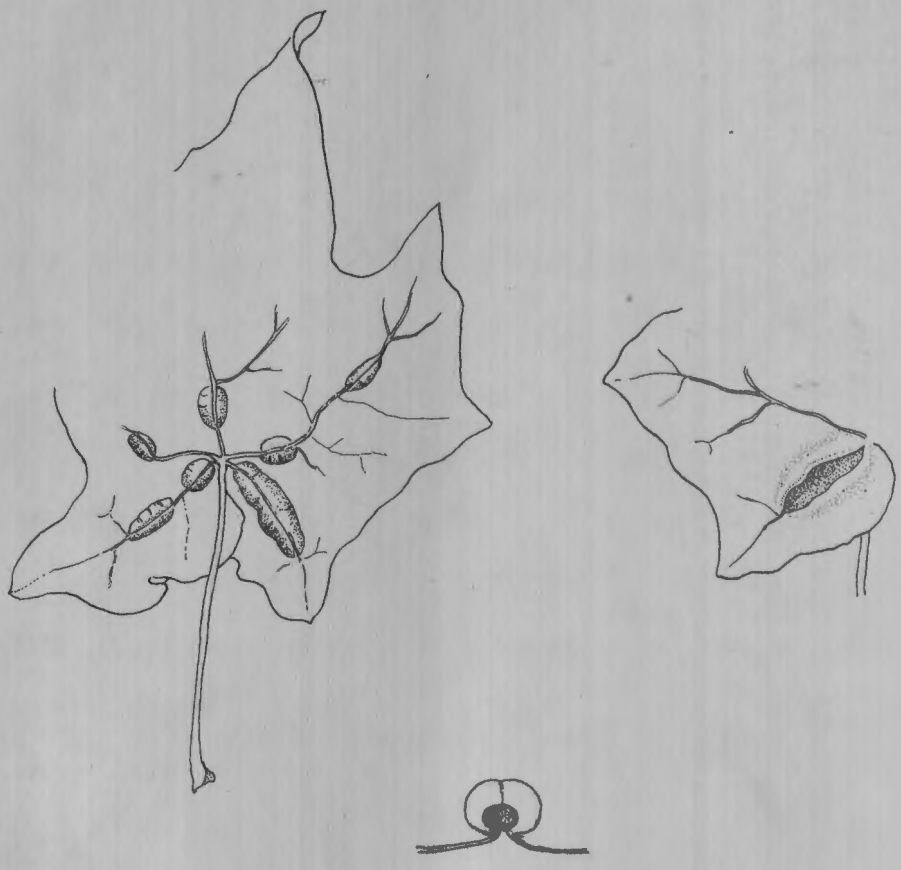
52.

Schizomyia petiolicola Felt.

Gall an elongated oval swelling of the petiole, usually near its junction with the blade, of the leaf, slightly grooved lengthwise as the normal petiole is, and of same color, length 1.5 - 2.5 mm., width .5 - 1 mm.; cavities rather indefinite, separated by the partly disintegrated, swollen pith in which they are formed, wood and cortex only slightly enlarged, uncommon, on wild grape, (Vitis vulpina), one or two occurring on a petiole, collected in September.

Cecidomyia unguicola Beutenmüller.

Galls on lower surface of leaf, attached by a small area which appears on upper surface as a minute elevation .5 mm. in diam., cone-shaped, sharp-pointed at apex, expanded at base into a rim, surface smooth, very slightly g grooved lengthwise, light green or yellow when dry, 2 - 3 mm. wide across base, 4 - 5 mm. high; cavity single, oval, extending from base to apex, divided transversely at about the middle by a delicate membrane, larva in lower chamber, wall of upper part very thin, rim at base thickened, leaf slightly puckered; on hackberry (Celtis occidentalis), occurring in numbers on leaf, collected in July.



Dasyneura communis Felt.

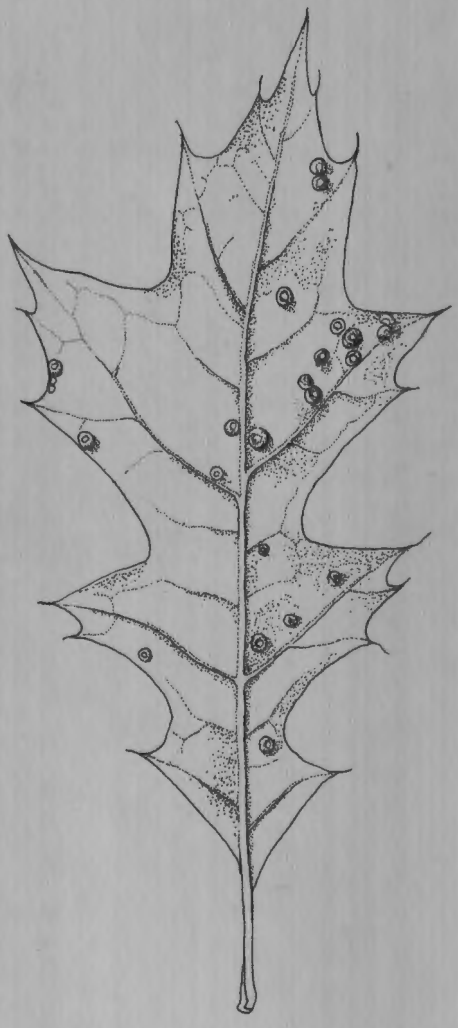
Galls pouch-like swellings on lower surface of leaf along one of principal veins, with a slit-like opening on upper surface which gapes open in old galls, surface when dry with transverse wrinkles which often split open and form cracks, brownish, probably green when young, width 4 - 5mm., length 4 - 12 mm., thickness 3 - 4 mm.; cavity single, immediately surrounded by a woody wall, outer portion of wall composed of firm, cellular substance, wall 1 - 1.5 mm. thick, thinner at point of union with blade, leaf puckered, sometimes entirely deformed; on hard maple (Acer saccharum), one to twelve occurring on a leaf, old specimens collected in September.

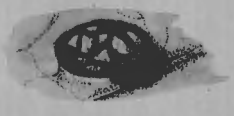
Itonida foliora (Rssl. and Hkr.) Felt.

Gall a fold of any part of leaf margin, on upper side, edge folded down firmly so that gall does not gape open, surface and color of leaf unchanged, length about 5 mm. - 3.5 cm., width 2 - 2.5 mm., thickness 2 mm.; cavity single, containing a few or many larvae, blade of leaf thickened, when dry hard and woody, on red oak (Quercus rubra), occurring in numbers on leaf; galls developing in May, insects remaining in larval stage through summer, becoming full grown by the last of September or the first of October, when all but those parasitized descend into the ground and pupate to pass the winter; adult insect emerging from the ground in May.(Russell and Hooker, Ent. News., v.19, p.349.)

Cecidomyia pustuloides Beutenmüller.

Galls projecting from both surfaces of leaf, slightly more from lower, blister-like, often with an irregular outline, with a minute, pointed elevation in center of lower side, green or crimson, brown when old, diam. 3 - 6 mm., thickness .75 - 1 mm., cavity single, central, large, containing one larva, wall thin, scarcely thicker than blade of leaf; common on red oak (Quercus rubra), and scarlet oak (Quercus coccinea), occurring in large numbers on leaf, collected in September and October, adults emergingthe following spring.

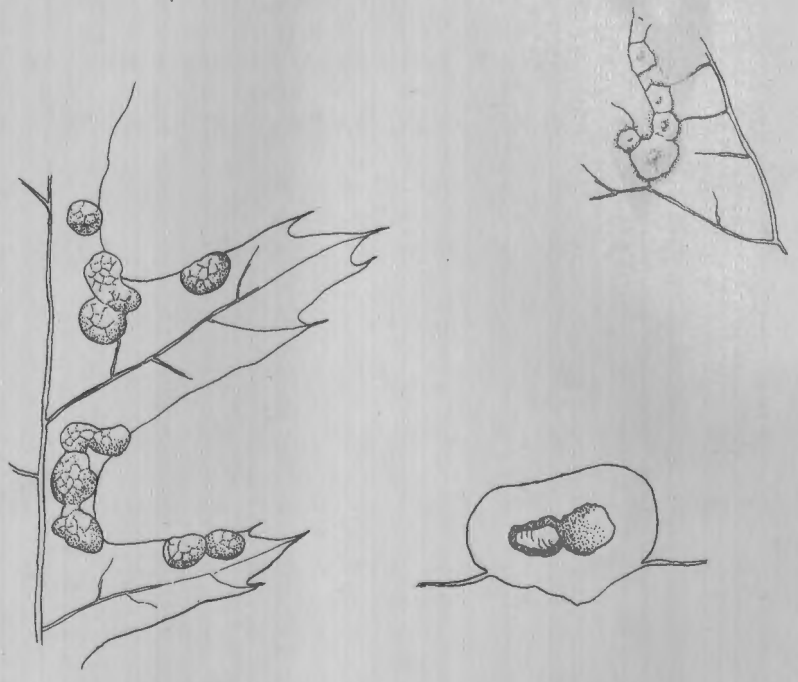




104.

Cinctiocornia globosa Felt.

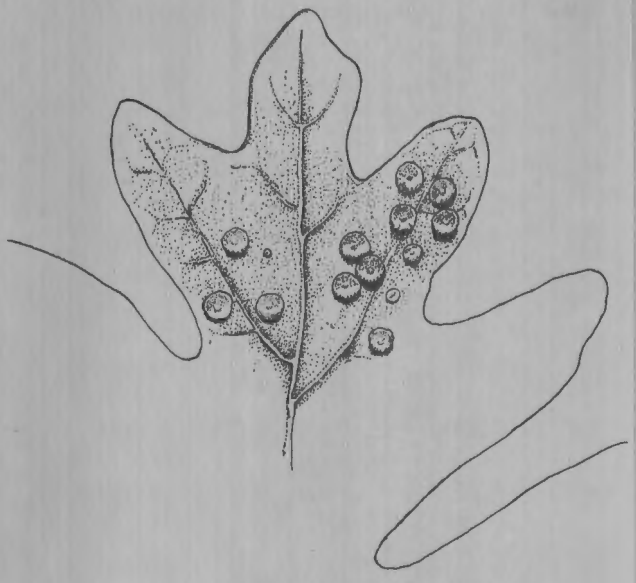
Galls on lower side of leaf, attached by a broad basal area, which causes a small blister on upper side, depressed spherical, surface slightly roughened and irregular, with a flattened apex on which is a small, smooth, yellowish disc, which is sometimes broken up into small pieces and scattered over surface, reddish when young, purplish black when old, diam. 2 - 3 mm., height 1 - 1.5 mm.; cavity single, central, large, containing one larva, wall thin, woody; on red oak (Quercus rubra), occurring scattered singly, few on a leaf, collected in September, falling to ground with leaf, adult emerging the following spring.



Cinoticornia pilulae Walsh.

Galls on upper surface of leaf, hemispherical or oval, often irregular in outline, point of attachment broad, surface almost smooth when young, covered by a network of fine cracks when old, outer layer partially peeling off and disclosing tissue beneath, light brown to reddish brown when mature, diam. 2 - 7 mm. or larger by coalescence of two or more galls, appears on lower surface as a slightly raised woody disc with a small,central elevation; cavity single, central, containing one or several larvae, wall pithy, 1 - 2 mm. thick; very common on red oak (Quercus rubra), and scarlet oak (Quercus coccinea), occurring singly or more often in large numbers on leaf, developing in June and forming a conspicuous object throughout summer and fall.

Sept. 6.



138.

Cecidomyia poculum Osten Sacken.

Galls on lower side of leaf, disc-shaped, center and margin raised, portion between depressed, point of attachment small, central, surface smooth, reddish purple, covered with a dense white bloom, diam. 2.5 - 4 mm.; cavity single, central, flattened, wall woody around cavity, pithy outside; uncommon, on white oak (Quercus alba), occurring in small groups or singly, collected in September, and October.

This gall has been described as dipterous, but Mr. Young of the N. Y. State Entomological Dep't., says that he has reared Cynipidous gall-flies from it.

168.

Rhabdophaga batatus Walsh.

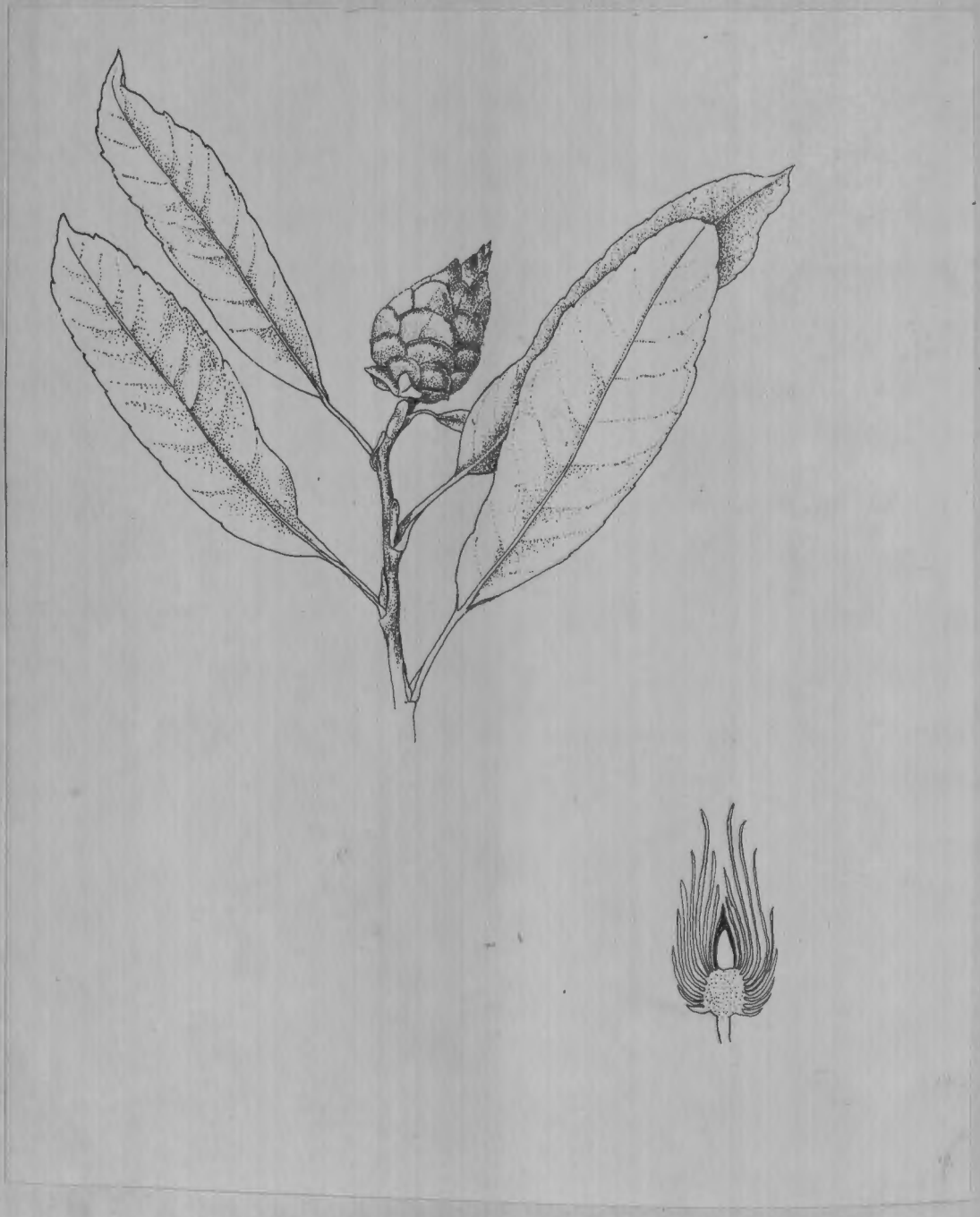
Galls irregular, rather abrupt swellings of petiole or stem, on one side of latter, or surrounding it, surface like that of bark, size very variable, about .5 - 5 cm. long, .5 - 1.5 cm. wide; cavities numerous, irregularly arranged, each containing one larva, surrounded and somewhat connected by woody walls, imbedded in pithy substance; common on willow (Salix), several usually near each other along stem, often fused, collected in September.

Rhabdophaga triticoides Walsh.

Galls transformed buds, causing a shortening and thickening of stem, bringing leaves close together, stem, buds and petioles covered with dense, white pubescence, stem thickened to about twice its normal size, but appearing much larger because of pubescence, length of swelling 3 cm. or more; cavities numerous, occuping entire interior of single bud-scale, and extending below its base a short distance into stem, length 5 - 7 mm., diam. about 1 mm., larva single, at base of cavity, substance of swelling woody.; on willow (Salix) collected in September.

Rhabdophaga brassicoides Walsh.

Gall terminal on stem, rossete-like, diam. 4 - 5 cm., composed of many stunted leaves, outer ones broader and shorter than normal ones, inner ones with only tips broadened, finally linear, larva among bases of leaves in center, surrounded when gall was examined in October, by a thin, papery, white cocoon; common on willow, (Salix developing from a terminal bud, the stem forming a small, flat receptacle for the prematurely expanded leaves, collected in September, remaining attached to plant throughout winter.



Rhabdophaga strobiloides Osten Sacken.

Gall terminal on stem, resembling a pine-cone, consisting of many stunted, closely overlapping leaves, outer ones broad, scale-like, rounded, sometimes with a "frilled" margin, silky-hairy, whole mass about 1.5 - 2.5 cm. in diam. at widest point, 1.5 - 3.5 cm. long, inner leaves linear, larval cavity central, a mere oval space among the bases of the leaves, occupied by a single larva, gall formed from a terminal bud, the stem of which develops little and forms a flat receptacle for the leaves; common on willow,(Salix sp.), developing in July and persistent on twig for several seasons, adult insects in spring of second year.

179.

Hormomyia verruca Walsh.

Galls projecting from both surfaces of leaf, slightly from upper, much more from lower, surface, rounded above, prolonged into one or several points below, each having a small opening in its apex, smooth, green, one-chambered, 3 - 4 mm. wide, 4 - 5 mm. high, or several-chambered, about 5 - 10 mm. wide, 4 - 10 mm. high; cavities on the same level in gall as its point of union with leaf, about .5 mm. wide, 1 mm. long in specimens examined, surrounded by a woody inner wall, outer portion of wall, softer, cavity connected with exterior by a slender tube , on Salix

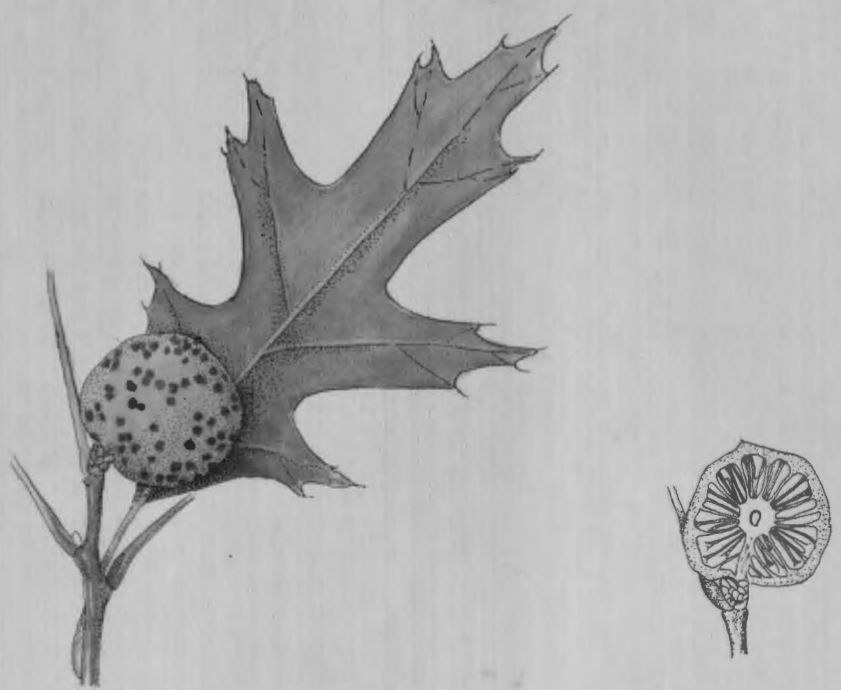
one or several occurring on a leaf, collected in June.

Hymenoptera.

Cynipidae.

Andricus? gallaestriatae Stebbins.

Gall in axil of leaf, spindle-shaped, with a long slender stalk, smooth, with about 9-11 lengthwise ridges, light brown with a faint pinkish tinge when dry, length 2.5 mm., diam. at widest point, 2.5- 3 mm.; larval chamber single, occupying widest portion of spindle, length about 5 mm., width 2- 2.5 mm., containing a single larva, wall hard and woody; rare, on scarlet oak, (Quercus coccinea) in September, adults emerging the following spring.



Amphibolips cooki. Gillette.

Galls developing from terminal buds, surrounded at base by bud-scales, spherical, with a small point at apex, smooth, green spotted with red when fresh, diam. about 1.5 - 2 cm.; larval chamber single, central, supported by radiating fibers, wall and fibers rather thick and succulent, becoming shriveled when old; develops in September, on red oak, (Quercus rubra), falling to ground with leaves.

Amphibolips prunus (Walsh) Beutenmüller.

Gall growing from side of acorn cup, point of attachment small, spherical, reddish or pink, shading to yellow toward center, smooth, size variable, diam. from about .7 to 1.6 cm.; cavity single, central, containing one larva, surrounded by a hard, woody wall 1-2 mm. thick, firm, fleshy, outer wall with a finely fibrous, radiating structure; uncommon, on scarlet oak (Quercus coccinea), usually occurring singly, size of gall and acorn correlated, large galls dwarfing the acorn, developing in August or September and falling to ground, adults following spring (according to Cook).

Callirhytis fruticola Ashmead.

Galls more or less spherical, developing from embryo within shell of an acorn, partly or wholly filling it, walls fusing with each other so that galls are not separable but form a compact mass, whitish, diam. 2 - 3 mm.; cavity single, containing a single larva, wall thin, hard, woody; probably common in acorns of scarlet oak (Quercus coccinea), but not causing any noticeable change in their appearance and not often observed, collected in September.

Amphibolips inanis Osten Sacken.

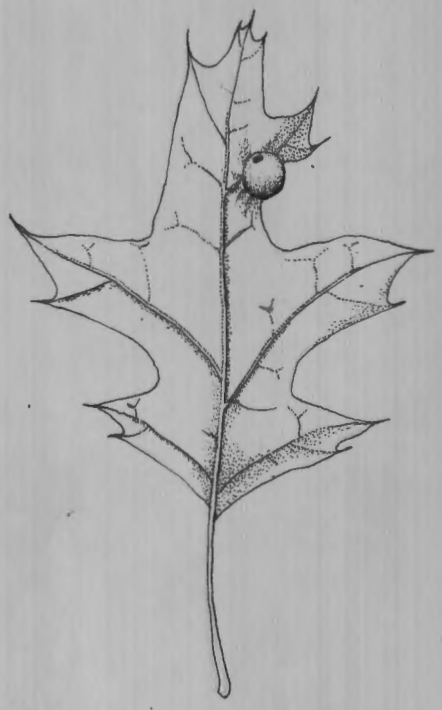
Gall spherical, on lower side of leaf, point of attachment small, surface smooth and shining, green when young, brown when old, diam. about 15 - 20 mm.; larval chamber central, oval, width 3 - 4 mm., length 4 - 5 mm., containing on larva, thin-walled, connected by radiating fibers with the outer shell which is succulent when young, but very thin and brittle when old; uncommon, on scarlet oak (Quercus coccinea), occurring singly on leaf, often dwarfing and deforming it, develops in May or June, adults emerging in June.

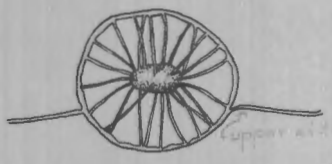
Amphibolips confluens form spongifica(θ.S.)Beutenmueller.

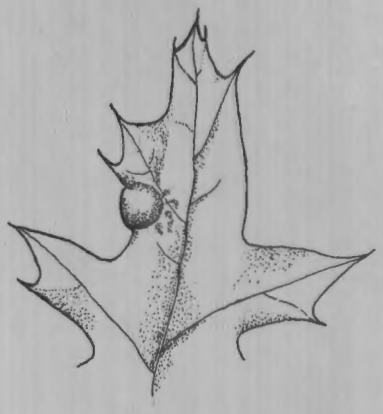
Gall spherical, attached by a small area to lower side of leaf, along midvein or one of larger veins,smooth, with many small elevations on surface, when young green and translucent, when old light brown and almost always covered by a dark brown powder, the spores of a fungus, Macrosporium sp., diam. 2-3 cm.; larval chamber single, central, containing one larva, width 2-3 mm., length 4 mm., connected by a spongy mass of fibers,,more compact about larval chamber, with a thin outer shell which is succulent when young, about 1 mm. thick, thin and brittle when old; common on scarlet oak, (Quercus coccinea), and red oak (Quercus rubra), occuring singly on leaf, sometimes almost entirely preventing its development,, appearing in May, and after emergence of adults in June, remaining dried on leaves until they fall.

Andricus rileyi Ashmead.

Galls growing in oval masses along midrib on lower side of leaf, 18 - 20 mm. long, 8 - 10 mm. wide, cone-shaped with base of cone (apex of gall) rounded, attached to midrib by pointed end, apex smooth or, when dried, finely reticulated with ridges, slightly purplish brown, height 4 - 5 mm., diam. at widest point 3.5 - 4 mm.; cavity single, very small when galls were found but probably becoming larger when larva completes growth; common on bur oak (Quercus macrocarpa) in latter part of August or September, falling to ground in September.







Andricus singularis Bassett.

Gall of "oak apple" type, spherical, projecting mainly from lower side of leaf, usually near margin, smooth, green when young, brown when old, width 4 - 5 mm., length 6 - 7 mm., larval chamber single, central, oval, width 2 mm., length 4 mm., connected by radiating fibers with the thin outer shell which is succulent when young, thin and brittle when old; uncommon, on scarlet oak (Quercus coccinea) usually occuring singly on leaf, developing in June, adults emerging in July.

Callirhytis pustulatoides Bassett.

Gall at point of a leaf-lobe, projecting equally above and below, spindle-shaped, terminated by bristle at end of lobe and looking as if tip of lobe had been inflated by forcing air between upper and lower epidermis, smooth, green when young, brownish when old, length 6 mm., width about 3 mm.; larval chamber oval, diam. about 1 mm.,length 2 mm., papery, lying unattached within thin-walled outer shell; uncommon, on scarlet oak (Quercus coccinea), occurring singly on leaf, developing in spring.

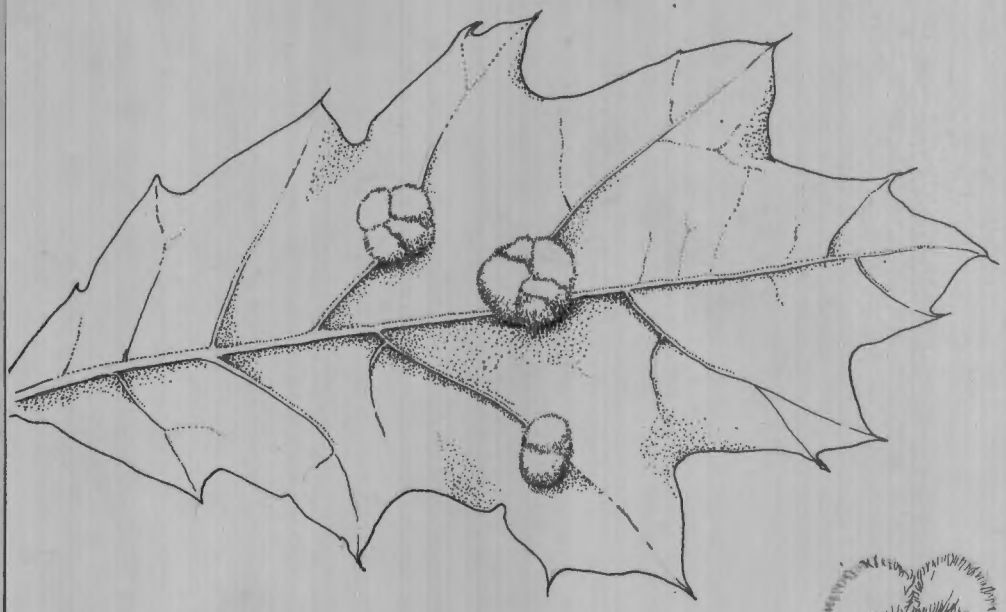
Cynips decidua Bassett.

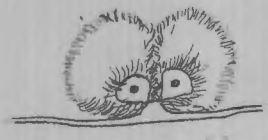
Galls in masses on lower side of leaf along midrib, cylindrical, with a constricted apex, smooth, greenish, or yellowish white, height about 5 mm., width 1 - 2 mm., seeming to burst through from inside of midrib, breaking and pushing aside outer layers; cavity at base, midrib slightly wider on upper surface; common on red oak (Quercus rubra), collected in August and September, falling to ground in September.

Galls irregularly spherical or oval swellings at base of petiole, chiefly on inner and upper side, character of surface unchanged, dark crimson on one side, greenish on other, diam. 5 - 7 mm., length 8 - 9 mm.; cavity single width .5 - 1 mm., length 1 - 1.5 mm., located in hard cellular tissue at one side of gall, other side woody; fairly common on scarlet oak (Quercus coccinea), usually causing the petiole to bend, collected in September.

Philonix compressa. Gillette.

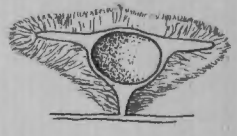
Gall depressed spherical or sometimes spherical, on lower surface of leaf, point of attachment small, smooth, with a slight bloom, rosy pink on one side, entirely deep rose pink, or almost wholly ivory white, diam. 2.5 - 4 mm.; cavity single, central, diam. about 2.5 mm., containing one larva, wall composed of a woody portion around chamber and a soft, semi-translucent portion outside; common on scarlet oak (Quercus coccinea), one or occasionally several on a leaf, developing in September and falling from leaf, adults emerging the following spring.





x2

Fig. 1.



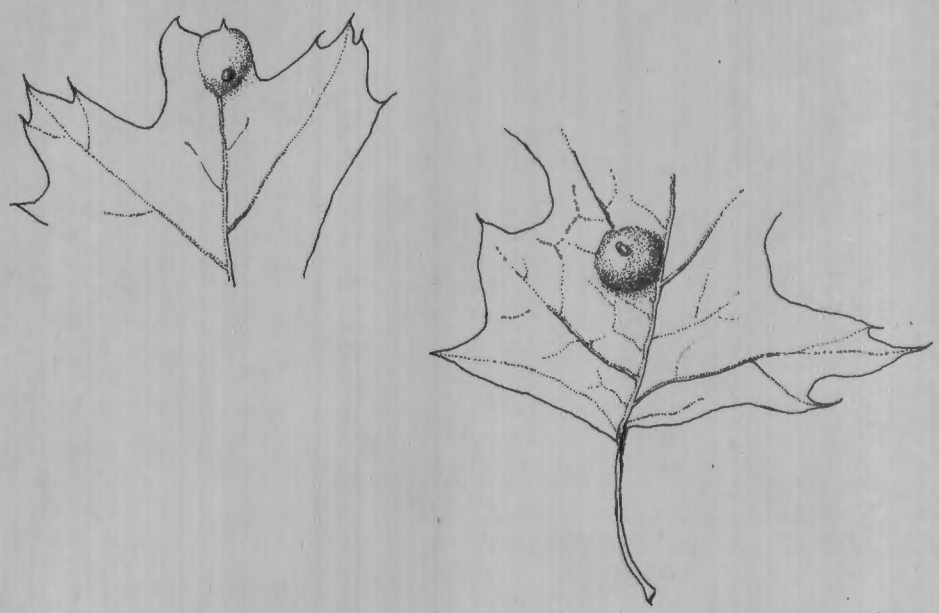
x3

Fig. 2.

Fig 1 — End of Acrocyst - Dorsal.
Fig 2 — Ectolaur

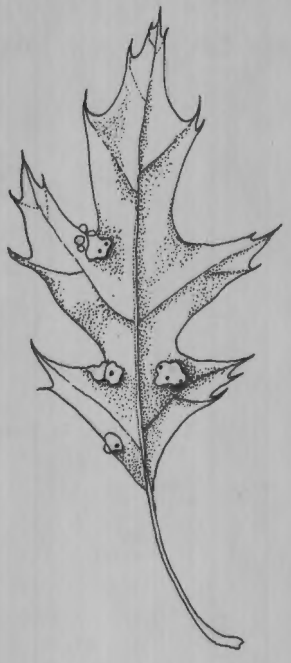
Dryophanta lanata Gillette.

Galls along lower surface of midrib, forming rounded, wooly masses composed of about 4 - 8 galls, each gall somewhat triangular in section, attached by one angle to the central line from which all the galls radiate, the other two angles formed by a flattened expansion which extends around the apex of the gall, shape caused by mutual pressure of individuals in group, rosy pink, deepest on expansion, covered with dense coating of pale brownish or almost white hairs about 2 mm. long, diam. across wing 5 - 7 mm., height 2.5 - 4 mm.; cavity single, central, containing one larva, diam. 3 mm., wall in mature gall thin, part surrounding cavity hard, woody, outer part softer, forming wing-like expansion and a small blunt pedicel for attachment; common on red oak (Quercus rubra), and scarlet oak (Quercus coccinea), one or several groups occurring on a leaf, collected in August and September, falling to ground in September or October.



Dryophanta palustris (Osten Sacken) Beutenmüller.

Gall on any part of blade or petiole of leaf, projecting equally above and below, spherical or slightly oval, looking not unlike a gooseberry, surface slightly roughened, covered with minute, scattered hairs, light green green, diam. about 1 cm.; larval cell single, oval, thin-walled, delicate, 1.5 mm. wide, 2 mm. long, unattached and rolling about freely within the outer wall which is succulent and 1 mm. thick; very common on scarlet oak (Quercus coccinea), one or several occurring on a young leaf, sometimes dwarfing and deforming it or almost entirely preventing its development, appearing in May, adults the latter part of the month.

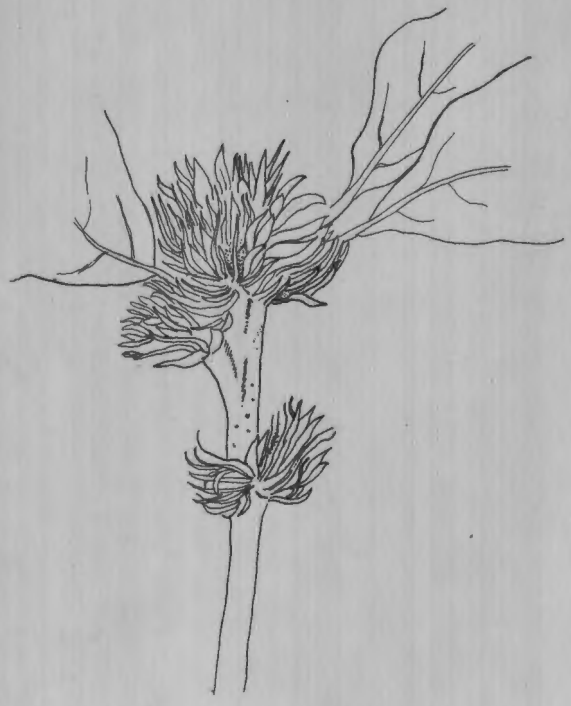


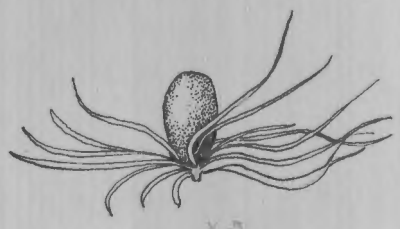
Neuroterus favosus Bassett.

Galls irregular swellings projecting from both surfaces of leaf, slightly more from upper, very variable in size and shape, surface above sunken between adjoining larval chambers or smooth, surface below uneven and slightly wrinkled, green when young, light brown when old, diam. about 1 mm. - height 2 - 5 mm., cavities one to many, long oval, placed close together with long axis at right angles to blade of leaf, width .5 - .75 mm., wall thin, very hard when old, inner part woody, outer part more spongy; common on scarlet oak (Quercus coccinea), usually several on a leaf, developing in July or later.

Holcaspis mamma (Walsh)

Galls irregularly spherical, on young twigs, point of attachment small, apex drawn out into a blunt point characteristic of the species, surface smooth or more or less wrinkled, light brown, diam. .5 - 1.5 cm. usually about 1.2 cm.; larval chamber a single, oval, thin-walled body 4 mm. wide, 6 mm. long, lying unattached in a slightly larger cavity in center of gall, outer wall composed of hard cellular tissue, 4 - 5 mm. thick; very common on bur oak (Quercus Macrocarpa), usually occurring in large masses and appearing to burst through from deeper tissue of twig, developing in autumn, adults emerging in October, galls remaining on twigs through winter.

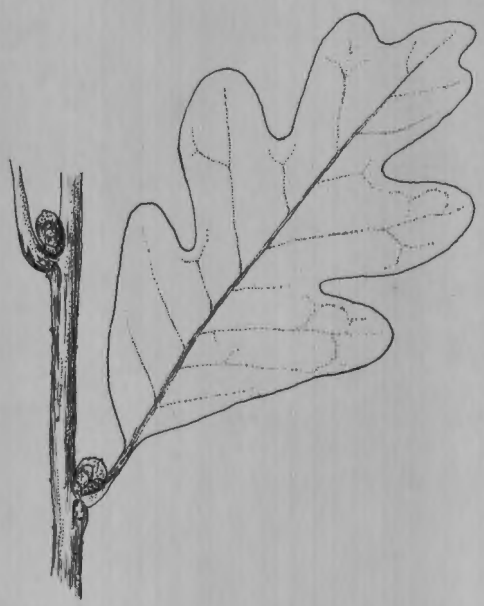




X 3

Cynips frondosa Bassett.

Gall surrounded by a mass of stunted leaves, variable in size, most of outer ones with broader blades, inner thread-like,gall in center of leaves, spherical, attached to undeveloped stem by a broad base almost as wide as its diam.,smooth, light brownish, fairly glossy, height 2 - 3 mm.; cavity single, containing one larva, wall thin, hard; common on bur oak (Quercus macrocarpa) formed from a bud which would normally expand the following year, the leaves partially developing, the stem remaining short and serving merely as a receptacle for the leaves,several buds, lateral and terminal,usually affected, found in September and October, adults the following spring.

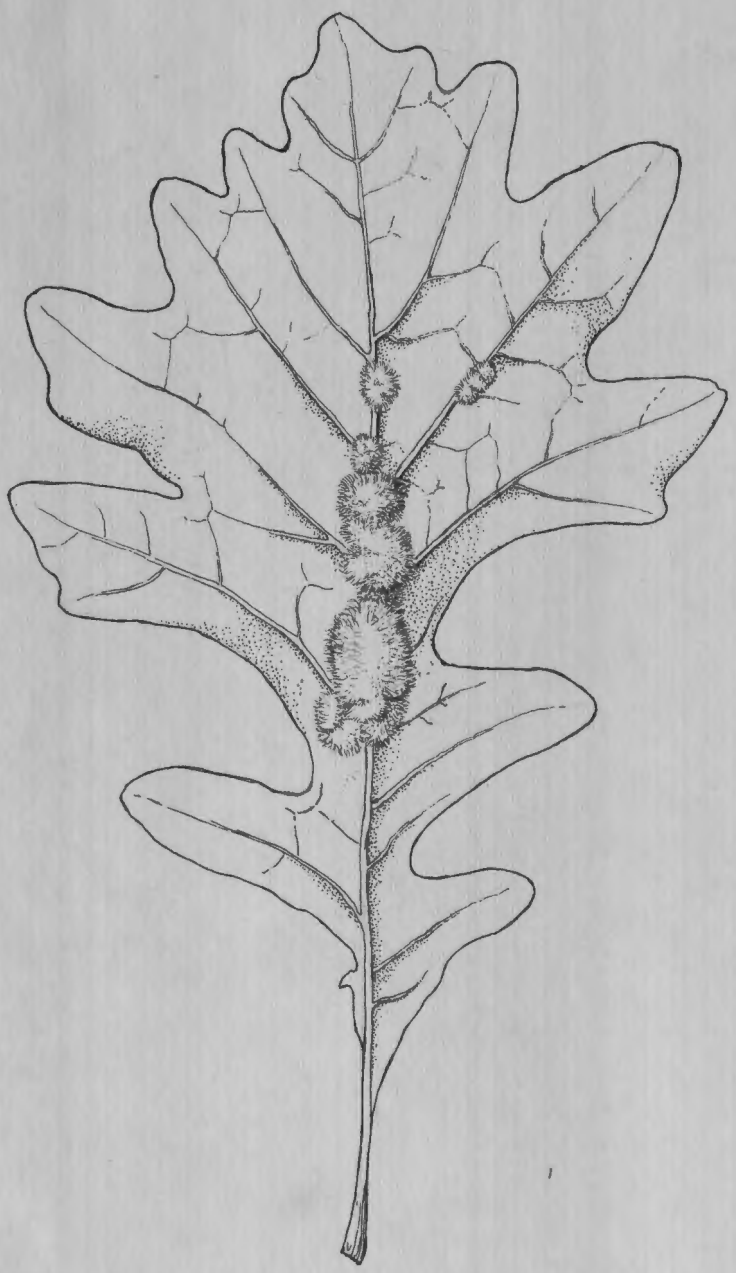


Neuroterus vesiculus (Bassett).

Gall projecting about 2 mm. from a bud, bud-scales slightly spread apart, spherical, with a small rounded projection at apex, smooth or slightly wrinkled, green, apical projection whitish, diam. of gall about 3 mm., attached to undeveloped stem-apex in center of bud which would normally develop the following year; cavity single, central, wall.5 mm. or less thick; on white oak (Quercus alba) and bur oak (Quercus macrocarpa), one or rarely two in a bud, developing in September.

Neuroterus flavipes Gillette.

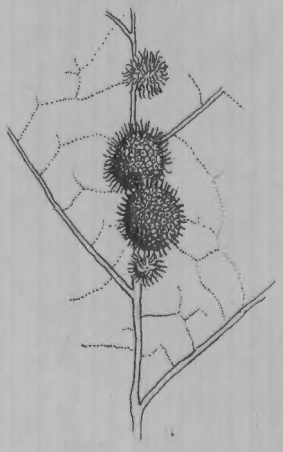
Gall a swelling of midrib or petiole of leaf, projecting above and below, irregular in size and shape, surface uneven, smooth or slightly wrinkled, green, turning brown when old, diam. about 2.5 - 6mm., length about 3 - 18 mm.; cavities one to about twelve, oval, 1 - 1.5 mm. long, irregularly arranged, lower portion of gall woody, upper and larger part less hard, more pithy, containing larval cavities; common on bur oak (Quercus macrocarpa) one or several occuring along midrib, often deforming leaf, causing it to fold lengthwise and curl upward, developing in in July, adults in July or August.

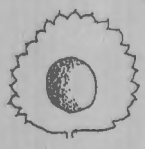


113.

Andricus pattoni (Bassett)

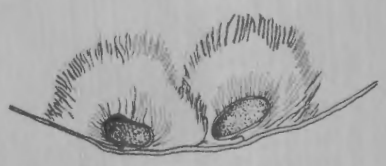
Galls forming a wooly, oblong mass, 5-20 mm. long, 7-8 mm. wide, along lower side of midrib, individual galls numerous, oval, light brown, densely covered with fine white or light brown hairs which completely obscure outline, height including hairs 3-7 mm. excluding hairs 2.5 mm., diam. 1.5-2 mm.; cavity single, large, containing one larva, wall thin, hard, brittle; very common on bur oak, (Quercus macrocarpa), rarely on white oak, (Quercus alba) one or several masses on leaf; eggs deposited in May but gall not developed until late August or September, adult insect emerging in following April.





Philonix erinacei Beutenmüller.

Galls spherical or somewhat irregular from coalescence of two adjoining galls, on upper or occasionally on lower side of leaf along one of larger veins, point of attachment small, surface covered with bristle-like hairs about 1.5 - 2 mm. long, arising from center of convex polygonal blocks which produce a "netted"effect, greenish or yellowish with a tinge of pink, diam. 6 - 14 mm.; cavities one or several, probably only by coalescence of adjoining galls, often seeming many-chambered because of presence of inquilines,diam. about 3 - 4 mm., containing a single larva,outer portion of wall, composed of polygonal areas less than 1 mm. thick, cellular in texture, inner portion harder; fairly common on white oak (Quercus alba), one or several occurring on leaf, developing in September.



Neuroterus floccosus (Bassett).

Gall on lower surface of leaf, depressed spherical, densely covered with whitish or when old with light brown hairs, giving gall a wooly appearance, diam. including hairs 1.5 - 5 mm., excluding hairs .75 - 1.5 mm., on lower surface of leaf, point of attachment small, gall occupying a slight depression in leaf which appears on upper surface as a smooth shining "blister"; cavity single, containing one larva, wall thin, hard, woody; common on bur oak (Quercus macrocarpa), scattered, usually in large numbers, often causing whole leaf to become curled downward, developing in August, falling to ground with leaves, adult insects the following spring.

Neuroterus saltatorius (Hy. Edwards)

Galls on lower side of leaf, spherical, apex usually concave, sometimes scarcely so, with a minute central elevatiom, smooth, light brownish, diam. .75 - 1 mm., point of attachment small, gall sunken in a closely fitting, cup-like depression which appears as a conspicuous elevation on upper side, rising about .5 - 1 mm. from blade; cavity single, containing one larva; common on bur oak (Quercus macrocarpa), occurring in great numbers on leaf, often entirely covering it, usually fewer on basal part, developing in June or July, falling to ground in July, larvae completing their development there.

The larvae have the power to make the galls jump about when freed from the leaf. Prof. Washburn says: "- a rustling sound could be heard across an ordinary sized room because of the movement of the larvae inside the galls.---In their detached condition the insects had the power of making the galls which surrounded them hop several inches from one place to another."(Thirteenth Report of the State Entomologist of Minnesota.)

123.

Callirhytis clavula Osten Sacken.

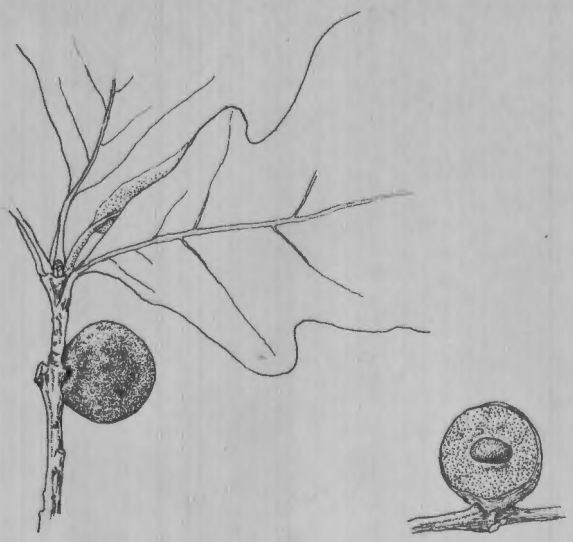
Gall a somewhat club-shaped enlargement of tip of twig, bearing upon it several buds and leaves apparently not much affected by development of gall, surface and color similar to bark of twig, covered with bluish bloom, size variable, twigs 3 mm. in diam. enlarging to about 10 mm. in diam. at widest point, length 10 - 15 mm.; cavities several, width 1 mm., length 2 - 3 mm., imbedded in woody tissue in center, outer part of wall composed of hard cellular substance; common on white oak (Quercus alba), developing in autumn.

Biorhiza forticornis (Walsh).

Galls of "oak apple" type, closely placed on young tw twigs, usually surrounding them, often also on leaves, occuring on both surfaces, especially along midrib, irregularly spherical when growing singly, often described as looking like pressed figs when growing in masses, attached by a small area to stem and appearing to burst through bark of twig from inside, very minutely pubescent, varying in color from pale yellow, usually with a tinge of pink on one side, to deep crimson or brown, size variable, diam. about 2 mm. to a trifle over 1 cm.; larval chamber basal, 1 - 2 mm. in diam., connected by numerous fine radiating filaments with the thin outer shell; occurring in large numbers on parts affected, in September and October, remaining on twigs over winter, adults emerging the following spring.

Callirhytis seminator Harris.

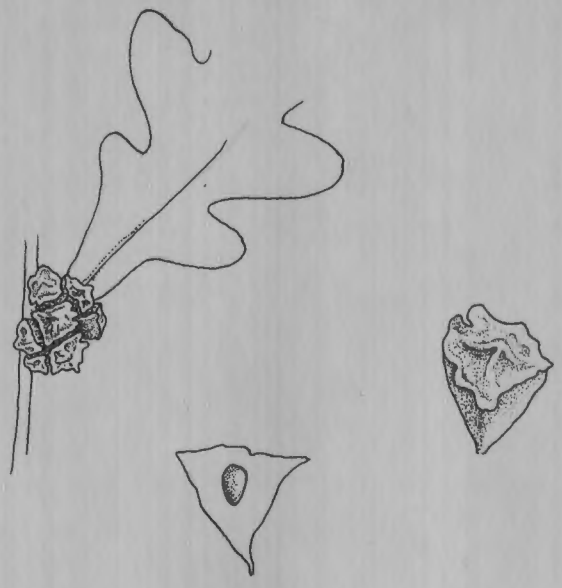
Galls surrounding small twigs, grouped in irregularly spherical, wooly masses, about 2 - 5 cm. in diam., individual galls long oval, attached to twig and radiating out in all directions, basal part almost smooth, upper part covered with long fibers forming a dense wooly coating, length 1.5 cm., width 2 mm., narrowing to a blunt point at base and apex; larval cell single, basal, 1.5 mm. wide, containing one larva, cavity surrounded by a hard, woody wall, substance of gall above cavity soft, fleshy, fibrous in texture; on white oak (Quercus alba), collected in June.

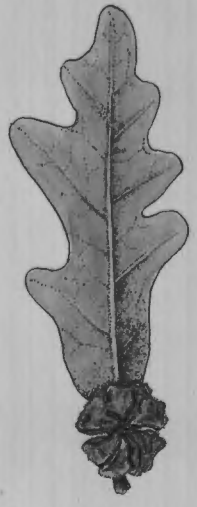


Holcaspis globulus (Fitch) Beutenmüller.

Galls attached laterally to young twigs, point of attachment small, spherical, smooth, light brown when dry, diam. 1 - 1.7 cm.; larval chamber oval, thin-walled, width about 4 mm., length 5 mm., contained in and almost filling a central cavity in the gall, outer wall composed of firm, cellular tissue; common on white oak (Quercus alba), occurring singly or in groups of two to four, developing from the stem part of buds (according to Cook), adults emerging in October.

Sept. 17.





Andricus sp.

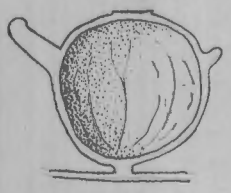
Galls growing in groups on lower side of petiole, about 6 - 12 in a mass, pyramid or wedge-shaped, all attached to a small area by their pointed ends, a point in center of flattened apex usually elevated, surface somewhat wrinkled, covered by very fine brown pubescence, height 5 mm., diam. across widest point 5 mm.; cavity single, central, very small in specimens examined, probably becoming larger in mature galls, wall hard and woody; fairly common on white oak (Quercus alba), developing in late August or September, falling to ground and completing development there.

Rhodites radicum Osten Sacken.

Gall irregularly lobed, much constricted at its point of union with base of stem, extending partly or wholly around the latter, smooth, dark brown, 1.5 - 5 cm. wide, 2 - 4 cm. high; cavities numerous, oval, 2 - 3 mm. wide, 5 - 6 mm. long, each containing one larva surrounded by a woody wall, imbedded in a pithy matrix, with woody strands, in larger galls, radiating from place of attachment to stem; on Rosa rugosa in September, adults in April of following year.

Rhodites bicolor (Harris) Beutenmüller.

Galls formed from leaflets of Rose, spherical, covered with spines 5 - 6 mm. long, green, diam. 5 - 6 mm.; cavity single, containing one larva, wall firm, 1 mm. thick; on wild rose (Rosa blanda), occurring singly or in groups, usually deforming whole leaflet, and when all leaflets are affected, appearing to arise from stem, collected in June.



153.

Rhodites gracilis Ashmead.

Galls on lower surface of leaf, spherical, with a small disc or scar at apex, encircled, a little below apex, by a ring of small,blunt projections, sides sometimes deeply ribbed, the ribs ending in projections, sometimes almost smooth, greenish or light brown, diam. 4 - 5 mm.; cavity single, central, containing one Rhodites larva, but frequently containing a number of parasitic larvae, wall thin, hard, brittle when dry; common on wild rose (Rosa blanda), collected in late August and September, adults emerging the following spring. Among these galls is found a gall very different in appearance: smooth, irregular, without projections, solid, with many cavities. It does not seem to occur separately, and probably it is a form due to presence of parasites or inquilines.

Rhodites lenticularis Bassett.

Gall a lens-shaped disc in blade of leaf, projecting equally above and below, with a slight elevation in center of lower side and sometimes of upper also, surface smooth, green or purplish, diam. 2 - 3 mm., thickness 1 - 1.5 mm.; cavity large, single, containing one larva, wall slightly thicker than blade of leaf and more woody; common on wild rose (Rosa blanda), occurring scattered singly or in small groups, often fused together.

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